الجمهـــوريـــــة الجزائريـــــة الديمـقـــراطيـــــة الشعبيـــــة
People`s Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research
National School of Cyber Security
Foundation Training Department
NSCS
المدرسة الوطنية العليا في الأمن السيبراني
NATIONAL SCHOOL OF CYBERSECURITY
وزارة التعليـم العـالـي والـبحـث العـلـمي
المدرســة الوطنيــة العليــا في الأمـن السيبراني
قســم التكويـــن القـــاعدي

Surname : ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒ **First Name :** ▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒

N° Student Card : ▒▒▒▒▒▒▒▒▒▒▒▒ **Date :** ▒▒/▒▒/▒▒▒▒

Section : ▒▒▒ **Group :** ▒▒ **Academic Year : 2024 / 2025**

Module : Introduction to Operating Systems 1 (SYST1) **Module Instructor : Dr. BENTRAD Sassi**

CODE : Reserved for administration **Lab. Instructor : Dr. SOUALMI Abdallah**

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Marker's Full name :

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PART 1: COURSE QUESTIONS (7 POINTS)

❑ EXERCISE 1 (4 POINTS) : Course Questions - *Answer the following questions briefly.*

1. What are the basic functions of an Operating System ?

- **Process Management** : Execution Sequence (Process) ; Hardware Event Management; …
- **Information Management** : Memory Management ; File and Directories Management; …
- **Communication management** : Input/Output Management; Network Management; …
- **Security and Protection** : Information Security and Protection; Resource Security and Protection; Etc.

2. Explain briefly the principle of virtualization

Virtualization is a foundational technology that allows a single physical machine (host) to run multiple virtual instances (virtual machines or VMs) that behave as independent systems. Each virtual machine runs its own operating system (guest OS), applications, and processes, while sharing the underlying hardware resources of the host machine.

3. How can an operating system distribution be used (kind of use) ?

WSL (Windows Sub-system for Linux) ; Virtual Machine ; Dual-boot setup ; Live DVD ; clef USB live

4. What is a Bootloader ? Give some examples

The bootloader is software that controls the boot procedure of your computer. Loaded by the BIOS when the machine is turned on and takes care of launching the operating system.
Examples de Bootloader :
GRUB (Grand Unified Bootloader) ; **LILO** (Linux Loader); **Syslinux**; Windows Boot Manager (**BOOTMGR**); **U-Boot** (Universal Boot Loader); **UEFI** Bootloader

5. Cite the different types of Linux distributions

Linux distributions can be broadly categorized into **three main types**: **desktop**, **server**, and **embedded** distributions.

This area will be cut.

❑ **EXERCISE 2 (3 POINTS) :** *Answer the following questions by means of short answers or the use of commands.*

	Questions	Answers
01	Give two characteristics of the Linux operating system	Open Source; Multitasking; Multiuser Support; Stability and Reliability; Security; Customizability; Modular; Free Software; Wide Hardware Support
02	What is the **type of kernel** on UNIX/Linux systems ?	**Monolithic** kernel : The entire OS, including core functions, runs in a single address space in kernel mode.
03	What are the distinct paths in the evolution of Unix-like systems ?	**System V** and **BSD** (Berkeley Software Distribution)
04	How to get a command's documentation using various built-in tools ?	**man** — Display a Program's Manual Page **help** — Get Help for Shell Builtin **--help** — Display Usage Information **apropos** — Display Appropriate Commands **info** — Display a Program's Info Entry **whatis** — Display One-line Manual Page Descriptions
05	What is the significance of the **EXIT STATUS** ?	Information about the exit status codes: It is a value returned by a command or process when it completes. The exit status is often used to indicate whether the command was successful or if an error occurred.
06	What is the content of the directory : **/etc/passwd** ?	**User account information:** Username; Password; User ID (UID); Group ID (GID); User Information; Home Directory; Default shell assigned to the user
07	What is the content of the directory : **/etc/group** ?	**Group information:** Group Name; Password; Group ID (GID); Group Members
08	What is the content of the directory : **/etc/shadow**?	Encrypted password data and other account-related information.

PART 2 : LAB. EXERCISES (13 POINTS)

❑ EXERCISE 1 (2.75 POINTS) : True / False - *Check the correct statement.*

	Statements	True / False
01	In the Linux OS, we don't have hidden directories, we only have hidden files that start with dot (.)	☐
02	Each user has a home directory that is located in the **/user/** directory.	☐
03	The Linux's file system is unique, regardless of the number of disks and storage space	☒
04	**/user/** contains the personal directories of users.	☐
05	**<Ctrl+c>** clears the screen (equivalent to the clear command)	☐
06	**<Tab><Tab>** displays the possible completions when there are multiple possibilities	☒
07	The command **grep** is used to search for a word in a file.	☒
08	The directories **./** and **../** are hidden directories.	☐
09	The concatenation of the current directory path and the relative path gives the absolute path.	☒
10	The command **chgrp** changes the owner and the group of a file or directory	☐
11	Using **chown**, only root can change the owner	☒

❑ EXERCISE 2 (2 POINTS) : QSM / QCS - *Check all correct statements.*

The correct statement(s) (**+0.25**) ; the wrong statement(s) (**- 0.25**) ; If you choose no statements then (**0**) .

Q1	Process of turning on the computer and loading operating system files from disk to memory is known as?							
	Loading		Opening		Booting	☒	Compiling	
Q2	On the UNIX/Linux system, the entire file system:							
	Is part of several tree trees.		Is organized into a single tree whose root is presented by /	☒	Has a hierarchical structure of files organized in directories.		All Answers Are Incorrect	
Q3	When creating an account for the user user1, the system assigns the user to:							
	An UID (User ID)	☒	An GID (Group ID)	☒	A connection directory that is located in **/tmp/home/1cpi**		A Shell to interpret only internal commands.	
Q4	The command test has the following two options o and p . Which syntaxes are correct ?							
	test -o -p parameters	☒	**test** op parameters		**test** -op parameters	☒	**test** o p parameters	
Q5	What is the command that allows you to search for the manual by a keyword:							
	apropos keyword		**man** -k keyword	☒	**apropos** keyword command		**man** -keyword command	
Q6	Executing the command '**ls -la ./** ' allows:							
	Shows all hidden files		Shows all files and directories in the current directory (including hidden ones) along with their attributes.			☒	Shows attributes of all files, even hidden files	
Q7	Each line of the terminal is of the form:							
	Machine Name @ User Name: ~$		Machine Name @ User Name: The Filename $		Username @ Machine Name: Current Directory $	☒	None of these answers are correct	
Q8	The current directory is /home/user. To display all files and directories (including hidden files) in the /etc/NSCS directory, sorted by their last modification date, you need to execute the command:							
	ls -l -a -d ../.. /etc/NSCS		**ls** -l -a -t ../etc/NSCS		**ls** -ald /etc/NSCS		**ls** -alt ../../etc/NSCS	☒

❑ **EXERCISE 3** (3 POINTS) : *Give the shell command to get the expected results / information for each of the statements.*

	Results / Information	Shell Commands
01	What is the installed distribution ?	cat /etc/issue
02	Open a new terminal using a different account.	su user
03	List, in detail, the contents of the directory **/etc**	ls -la /etc
04	Display, in alphabetical order, the users defined in the file **/etc/passwd**	cat /etc/passwd | sort
05	Rechercher tous les fichiers du répertoire **/etc** contenant la chaine de caractères "root".	grep root /etc/*
06	Position yourself under the directory "**Source**".	cd source
07	Go back to the home directory and destroy "**Source**".	cd .. rmdir Source
08	Close a session : Terminate all running processes named **systemd**	killall systemd
09	Immediately shuts down the system and stops all processes	sudo shutdown -h now
10	Immediately shuts down the system and stops all processes (but with the time specified as 0 (zero) minutes from now).	sudo shutdown -h 0
11	Halt immediately the system, stopping all processes (but it doesn't provide as much flexibility or timing options).	sudo halt
12	Powers off the system immediately, essentially shutting down and cutting power to the hardware.	sudo poweroff

❑ **EXERCISE 4** (5.25 POINTS) : **True / False** - *Indicate True whether the command is correct, and the correction if it is false.*

	Commands	True/False	Correction
01	user1@NSCS:~$ mv -r linux Linux	False	user1@NSCS:~$ mv linux Linux
02	user1@NSCS:~$ touch p file1	True	
03	user1@NSCS:~$ ln -s linux/ Bureau/lien	False	user1@NSCS:~$ ln -s /home/user1/linux/ /home/user1/Bureau/lien
04	user1@NSCS:~/Bureau$ cat TP01	False	user1@NSCS:~/Bureau$ cat ../TP01
05	user1@NSCS:~$ rmdir ../user1/TP01	False	user1@NSCS:~$ rm ../user1/TP01
06	user1@NSCS:~$ id -G	True	
07	user1@NSCS:~$ Pwd	False	user1@NSCS:~$ pwd
08	user1@NSCS:~$ cd /~	False	user1@NSCS:~$ cd ~
09	user1@NSCS:/home$ cd Bureau	False	user1@NSCS:/home$ cd user1/Bureau
10	user1@NSCS:~/Bureau$ touch -p OS1/cours.txt	False	L'option -p n'est pas une option dans la commande touch : user1@NSCS:~/Bureau$ touch OS1/cours.txt